

22 Points Total

Instructions:

1. Go to [phet.colorado.edu](http://phet.colorado.edu), and find the 'Sound' simulation.
2. Movable items:
  - a. in 'Listen to a Single Source,' the person moves left and right.
  - b. in 'Measure,' the blue lines, ruler, and Simulation Time box.
  - c. in 'Two Source Interference,' the person and the top speaker.
  - d. in 'Interference by Reflection,' the wall angle and position.
3. Follow the rubric and answer the questions.

Rubric:

1. Listen to a Single Source tab:
  - a. What is the relative pitch (low, medium, or high) when the frequency is at 250 Hz? (1 point)
  - b. What is the relative pitch (low, medium, or high) when the frequency is at 500 Hz? (1 point)
  - c. What is the relative pitch (low, medium, or high) when the frequency is at 750 Hz? (1 point)
  - d. When the person is moved from the center position to the right, what happens to the loudness of the sound? (1 point)
  - e. When the person is moved from the center position to the left, what happens to the loudness of the sound? (1 point)
2. Measure tab:
  - a. What is the wavelength of the waves at 250 Hz? (1 point)
  - b. What is the speed of the wave at 250 Hz? (1 point)
  - c. What is the wavelength of the waves at 500 Hz? (1 point)
  - d. What is the speed of the wave at 500 Hz? (1 point)
  - e. What is the wavelength of the waves at 750 Hz? (1 point)
  - f. What is the speed of the wave at 750 Hz? (1 point)
3. Two Source Interference tab:
  - a. With the frequency at 500 Hz, are there places where the sound seems to disappear? (1 point).
  - b. At what location(s) is the place where the person experiences the loudest sound? (1 point).
  - c. With the frequency at 250 Hz, are there places where the sound seems to disappear? (1 point).
  - d. At what location(s) is the place where the person experiences the loudest sound? (1 point).
  - e. With the frequency at 750 Hz, are there places where the sound seems to disappear? (1 point).
  - f. At what location(s) is the place where the person experiences the loudest sound? (1 point).

4. Interference by Reflection:

- a. With the frequency at 250 Hz, draw the pattern produced by the reflection from the wall.  
(1 point)
- b. With the frequency at 500 Hz, draw the pattern produced by the reflection from the wall.  
(1 point)
- c. With the frequency at 750 Hz, draw the pattern produced by the reflection from the wall.  
(1 point)

5. Listen with Varying Air Pressure:

- a. What happens as air is removed from the box? (1 point)
- b. What happens as air is pumped back into the box? (1 point)